Management of patients with ocular neuropathic pain

The cornea, although relatively small, measuring 11.5 mm in diameter and 0.5–0.8 mm in thickness, is one of the most densely innervated structures of the human body.[1] The nerves of the cornea are susceptible to damage by noxious stimuli, resulting in perception of pain. If pain is apparent in response to benign stimuli, and/or beyond the phase of normal healing, this condition is aptly named "neuropathic pain." Other terms used to describe this condition include "pain without stain," "corneal neuralgia," "keratoneuralgia," and "corneal pain syndrome." It has been demonstrated previously that development of keratoneuralgia can occur after iatrogenic intervention, systemic disease, and chronic dry eye.[2] Additionally, psychiatric comorbidities have been implicated in its pathogenesis.[3]

Treatment for this condition is currently quite variable. The charts of 10 patients with keratoneuralgia were reviewed retrospectively at 3 different centres in Toronto. Demographic information, risk factors for development, visual acuity, as well as treatments used and response to therapies were recorded. Ethics approval was obtained from the University of Toronto and conformed to the declaration of Helsinki (REB #35863). All inciting conditions and visual acuities are listed in Table 1.

Overall the treatment of neuropathic pain is challenging and must be multimodal in order to address the full extent of the disease. The patients in this study were similar to those described in previous studies and consisted of a wide heterogenous group of individuals with multiple risk factors for the development of neuropathic pain. Four patients suffered from psychiatric comorbidities, including anxiety, fibromyalgia, and depression.

In a recent review, Goyal and Hamrah[4] discussed an algorithm for addressing this debilitating disorder. It was suggested that the following should be included in treatment for these patients: increased production/retention of tears, the use of both systemic and topical anti-inflammatory drugs, autologous serum, and neuromodulator therapy. All of the above were trialled in the patient population described.

These treatment modalities address the issues after they have developed and did not result in full resolution. In light of this, patients with known risk factors for keratoneuralgia should be counseled about the risk of development of this condition before ocular surgery.

It would be prudent to consider a multidisciplinary approach involving mental health professionals, optometrists, and ophthalmologists to assess for possible development of this condition pre-operatively. In cases where this occurs subsequent to chronic dry eye, it would be important to optimize underlying risk factors, including mental health issues, to assist with decreasing morbidity from the disease.

Other interventions reported include acupuncture, intrathecal anesthetic infusions, omega-3 tablets, exercise, Botox targeting the trigeminal nerve innervation of the cornea, transcutaneous electrical nerve stimulation, and anecdotally, cannabidiol (CBD oil) or medical marijuana. Current research remains sparse, and additional studies are required to provide information regarding their long-term efficacy.[5]

At this time, there is no described single paradigm that can fully cure patients of their pain syndrome. Pre-operative risk assessment and postoperative multispecialist management are needed to care for patients who develop this highly morbid condition.

Table 1—Demographic data for patients included in this study

Patient	Sex	Age, y	Acuity of Affected Eye(s) OD	OS	Inciting Condition
1	F	54	20/20	20/20	Lasik
2	M	50	20/20	20/20	Dry eye
3	F	70	20/20	20/20	Dry eye
4	F	71	20/150	20/60	Dry eye
5	M	70	20/20	—	Lasik
6	M	49	20/25	20/20	Lens exchange
7	F	67	20/25	20/20	Cataract extraction
8	F	43	20/20-1	20/25-2	Lasik
9	M	36	20/40	20/30	Lasik
10	M	31	20/20	—	Trauma
Overall	**50% M, 50% F**	**Mean = 54 ± 16**	**Mean = 20/30**		

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Footnotes and Disclosure

Authors report no conflicts of interest.

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